Chest Pain-Specific Legal Risk

Matthew DeLaney, MD*, Patrick Siler, MD

KEYWORDS

• Chest pain • Emergency medicine • Acute coronary syndrome
• Pulmonary embolism • Thoracic aortic dissection • Risk management

KEY POINTS

- Acute coronary syndromes, pulmonary emoblisms and aortic dissections account for the majority of chest pain related malpractice allegations.

Chest pain is one of the more common chief complaints in the emergency department (ED) accounting for over 10 million ED visits yearly resulting in an estimated cost of US$10 billion per year.[1] The emergency physician's differential diagnosis ranges from benign to acutely life-threatening etiologies with little distinction in how each might present. In addition to being an incredibly common chief complaint, chest pain-associated complaints are at the top for most common allegations of malpractice.[2]

In a retrospective analysis of over 6000 closed malpractice claims, Wong and colleagues found that when allegations of malpractice were made.[2] Approximately 66% of cases were dropped, dismissed, or withdrawn. Approximately 23% of the claims were settled with an average pay out of approximately US$300,000. For the 7.6% of cases that went to trial, the jury is generally sympathetic for the defense returning a verdict for the defendant in approximately 93% of cases. When the jury sided with the plaintiff, the average payout was approximately US$800,000.

Overall, cardiopulmonary conditions accounted for the majority of malpractice allegations with cardiac arrest (9.1%), acute myocardial infarction (4%), aortic aneurysm (2.3%), and pulmonary embolism (PE; 2.2%) being the most common conditions involved. In addition to being the most common sources of malpractice allegations, these cardiopulmonary conditions also had higher rates of claims being paid. When an allegation was made regarding malpractice associated with a myocardial infarction the paid–to–closed ratio was approximately 39%, which is well above the baseline rate reported for other conditions. The amount of money that was paid was notably

Department of Emergency Medicine, University of Alabama at Birmingham, 619 19th Street South, Birmingham, AL 35233, USA
* Corresponding author.
E-mail address: matthewcdelaney@gmail.com

Emerg Med Clin N Am 43 (2025) 57–65
https://doi.org/10.1016/j.emc.2024.05.025 **emed.theclinics.com**
0733-8627/25/© 2024 Elsevier Inc. All rights are reserved, including those for text and data mining, AI training, and similar technologies.

Descargado para Ricardo Rosas (ari08122010@gmail.com) en Ricardo Palma University de ClinicalKey.es por Elsevier en septiembre 02, 2025. Para uso personal exclusivamente. No se permiten otros usos sin autorización. Copyright ©2025. Elsevier Inc. Todos los derechos reservados.

SHOUT
SHARE
IT

higher for allegations involving aortic aneurysms with an average payment of approximately US$370,000.[2]

In all closed claims, error in diagnosis was the most common chief medical error cited. Because of the commonality of chest pain as an ED complaint and the high medicolegal risk it poses, emergency medicine research is full of studies aiming to enhance the diagnostic precision, efficiency, and cost-effectiveness for the evaluation of chest pain.

Here, we will focus on the 3 most common missed diagnoses involved in malpractice allegations of patients with chest pain: acute coronary syndrome, PE, and thoracic aortic dissection (AD).

ACUTE CORONARY SYNDROME

Acute coronary syndrome (ACS) is a leading cause of death in the United States and also a source of significant medicolegal risk in the ED. Historically, the rate of missed myocardial infarctions has been thought to be as high as 8%; however, over the past few decades, the incidence of missed ACS is thought to be closer to 2% of patients discharged from the ED. While the overall rates of missed ACS seem to be decreasing, this subset of patients still carry a significant risk of adverse event following discharge with Pope and colleagues noting that discharged patients had almost twice the mortality of similar patients who were admitted for further observation and monitoring. In Pope's study, those discharged from the ED with ACS were more likely to be women aged under 55 years, non-White, those who reported shortness of breath as their chief complaint or had normal or nondiagnostic electrocardiograms.[3]

The presence of chest pain as a symptom is sensitive for ACS, but not particularly specific. In fact, there are few symptom differences between patients with ACS and those without ACS who present to the ED.[4] Several historical features have demonstrated some utility and thus should raise suspicion: pain that is described as similar to or worse than a previous myocardial infarction (MI), radiation to one or both arms, pain on exertion, vomiting and diaphoresis have all been shown to be predictive for ACS in some models.[5] It is also well documented that the accepted traditional risk factors for coronary artery disease do not predict an individual's risk to present with acute cardiac ischemia. According to Dezman and colleagues, history and physical alone are unable to reduce a patient's risk of ACS to the generally accepted level of 1% to 2%, arguing the evidence clearly shows that "atypical" symptoms cannot rule out ACS, while "typical" symptoms cannot rule ACS in. They ultimately conclude patients presenting with symptoms compatible with ACS likely warrant further ED investigation with electrocardiogram (ECG) and troponin measurement unless an alternative cause can be readily identified.[4]

The Electrocardiogram

With any suspicion higher than low probability for ACS, the ECG should not be the sole diagnostic tool used for evaluation. Physicians should have a low threshold to obtain serial ECGs in patients being evaluated for ACS; serial ECG utilization has been able to identify up to 16% of acute MIs not seen on initial presenting ECGs.[5] The miss rate of emergency physicians is similar to physicians of other specialties,[6] with a low incidence of clinically significant errors.[7,8]

The Troponin

For patients with more than a minimal risk, a troponin test will generally be done. Depending on the timing of the onset of pain (it needs to have been present long

Descargado para Ricardo Rosas (ari08122010@gmail.com) en Ricardo Palma University de ClinicalKey.es por Elsevier en septiembre 02, 2025. Para uso personal exclusivamente. No se permiten otros usos sin autorización. Copyright ©2025. Elsevier Inc. Todos los derechos reservados.

enough that the test will have turned positive) and if a conventional or high sensitivity troponin are being employed, 1 or 2 troponins can be done. Wassie and colleagues found that when a clinician used judgment in combination with the HEART score in deciding on 1 or 2 troponin tests, the second troponin was only positive 1 out of 200 times, there was no difference in outcomes; but most interestingly less than half of the clinicians ordered a second troponin… hard to say that ordering 2 troponins is standard of care (what a like or similarly trained clinician would do in a like or similar situation).[9]

In general, emergency physicians do a pretty good job of evaluating potential ACS. Review of claims data by the Insurance Committee of the American College of Emergency Physicians on missed MIs reveals that when we do miss, the patients were significantly younger, had less classic presentations, had fewer ECGs performed, and were seen by physicians with significantly less ED experience, who performed less thorough histories/documentation and were more prone to ECG misinterpretation.[10] Allegations of malpractice usually center around error in diagnosis or "failure to consider." More recently, risk stratification, diagnosis, and disposition in this patient population has been aided by the development of high-sensitivity troponin assays as well as validated, evidence-based decision tools such as the HEART pathway that when appropriately applied are able to identify a cohort at very low risk for adverse outcome.

PULMONARY EMBOLISM

PE is commonly seen in the ED and still accounts for a notable portion of chest pain-related allegations of malpractice. In an analysis of 277 malpractice cases involving PEs or deep vein thrombosis, Wilson and colleagues found that emergency physicians were involved in approximately 18% of the cases.[11] Overall, the most common suspected cause of PE was recent surgery, which accounted for 41% of the claims. In terms of the specific allegations of malpractice "failure to diagnose and treat" accounted for 62% of cases; 80% of cases involved an allegation of negligence that led to the patient's death. From a risk management standpoint, when these cases went to trial, the outcomes were different than what has been reported in other similar studies with only 16% of cases being settled prior to trial. When a verdict was returned, the jury sided with the defendant in only 57% of cases with 27% of cases ending in a verdict for the plaintiff. When a verdict was returned for the plaintiff, the median payout was approximately US$1,000,000 with a mean payout of approximately US$2,000,000.

One of the challenges associated with diagnosing PE is that patients often present atypically. In an analysis of data from the PIOPED II study, Stein and colleagues shed light on the variable presentations that can come from an underlying PE.[12] Unfortunately, a lot of the classic symptoms that we associate with PE were not seen in the majority of patients; only 44% of patients reported hemoptysis or pleuritic chest pain. New dyspnea either at rest or with exertion was the most common symptom and occurred in 73% of patients. Interestingly, most patients reported dyspnea at rest with only approximately 16% of patients having dyspnea only with exertion. Patients commonly reported that their dyspnea had a rapid onset, described as within seconds or minutes in over 80% of cases.

In terms of risk factors, 94% of patients had at least 1 risk factor for developing a PE with immobilization following surgery being the most common. Clinically, about 50% of the patients had tachypnea while only approximately 25% of patients were found to have tachycardia. While there is a clear association between the presence of a deep vein thrombosis and the presence of PE, only 32% of patients had any signs of calf

Descargado para Ricardo Rosas (ari08122010@gmail.com) en Ricardo Palma University de ClinicalKey.es por Elsevier en septiembre 02, 2025. Para uso personal exclusivamente. No se permiten otros usos sin autorización. Copyright ©2025. Elsevier Inc. Todos los derechos reservados.

swelling or pain. Though many patients did not have classic findings taught about PE, almost all (~98%) had dyspnea, tachypnea, pleuritic pain, or signs of deep vein thrombosis.

Making the diagnosis of PE when patients do not have classic symptoms remains a challenge. A case from 2015 sheds light on the current landscape associated with allegations of malpractice; in this high-profile case, a 15 year old patient was 1 week status postarthroscopic knee surgery and presented to the ED with a complaint of left chest pain that was noted to be worse when lying down. He denied fever and dyspnea, and he had normal vital signs. A chest radiograph and EKG were reported to be normal. He was diagnosed with pleurisy, administered a dose of ketorolac, and was sent home with a prescription for anti-inflammatories. Two weeks later the patient re-presented to the ED complaining of chest pain and dyspnea and unfortunately died from bilateral pulmonary emboli.

A malpractice case was filed, and the case ultimately went to trial. The plaintiffs hired a well-known high-profile emergency physician who claimed that on review of the chart that the patient had a "Q3T3″ pattern on his EKG and signs of cardiomegaly on his radiograph—both of which allegedly were suggestive of an underlying PE. The plaintiff's experts claimed the care was "grossly improper, egregious, and contrary to well-known and fundamental medical principles." The jury returned a verdict for the plaintiff and agreed with the allegation that the physician was guilty of "gross negligence," which in Georgia has been defined as failing to provide a "slight" degree of medical care.[13] Interestingly, one of the plaintiff's experts was subsequently censured by the American College of Emergency Physicians regarding his testimony in this case.[14] This is consistent with the previously mentioned study by Wilson and colleagues, which found that 41% of the PE/deep vein thrombosis (DVT) malpractice cases had previous surgery.[12]

As with ACS from a risk management standpoint, the biggest allegations of malpractice related to PEs tends to be "failure to consider." Given the prevalence of PE and its associated rates of litigation when it is missed, it would be reasonable to consider it in any patients who have undifferentiated cardiopulmonary symptoms. While this may seem like a wide net to cast, when we use a structured approach to working up a potential PE, we are more accurate than when we rely on our bedside gestalt. In a retrospective analysis of over 1500 ED patients, Medson and colleagues found that "clinical hunch" or gestalt was associated with lower rates of PE diagnosis when compared to the pulmonary embolism rule out criteria (PERC) Rule, Wells score, revised Geneva score, and Years criteria.[15]

When it comes to making the decision to work up a patient, a common concern is that if we apply clinical decision tools and tests like a d-dimer, then we will end up unnecessarily testing a larger number of patients. While Hoo and colleagues found that the rate of computed tomography (CT) angiograms that were positive for PE increased from approximately 3% to approximately 16% after the Well's score and d-dimer was incorporated into the electronic health record, suggesting that this structured approach led to more appropriate use of testing and imaging.[16] There is an ongoing debate about the nuances of how to work up a potential PE, but as we see in this case, the big risk to both the patient and the clinician comes most often from failure to even *consider* the diagnosis rather than a missed diagnosis as a result of using a particular risk stratification system or particular brand of d-dimer. Even in a situation where PE is so unlikely that it would seem unnecessary to pursue any formal risk stratification simply documenting "PE would be highly unlikely because…" may offer a layer of medicolegal protection against allegations of "failure to consider."

Descargado para Ricardo Rosas (ari08122010@gmail.com) en Ricardo Palma University de ClinicalKey.es por Elsevier en septiembre 02, 2025. Para uso personal exclusivamente. No se permiten otros usos sin autorización. Copyright ©2025. Elsevier Inc. Todos los derechos reservados.

AORTIC DISSECTION

While we have reliable and accurate ways to risk stratify patients who have potential ACS or PE to date, risk stratifying cases of potential AD remains challenging. From a medical standpoint, cases of AD are relatively rare, occurring in as few as 3 per 100,000 persons.[17] Another study showed that AD occurs in 1 out of 12,000 ED visits, 1 out of 980 chest pain visits to the point that the average full-time emergency physician would only see one case every 3 to 4 years.[18]

In addition to being seen only occasionally, cases of AD often present atypically as classic findings related to the historical elements and physical examination findings are not reliable and when studied have negative likelihood ratios that make it nearly impossible to rule out the diagnosis based on the history or physical examination. Even classic radiographic findings such as a widened mediastinum on chest radiograph does little to move the diagnostic needle. More recently, risk stratification tools such as the AD detection risk score have been developed—but not surprisingly, these too struggle to offer reliable diagnostic clarity.[19] Cases of AD can present a medicolegal perfect storm as they present sporadically, atypically, and are difficult to diagnose at the bedside. It has been said that "…when dealing with AD the standard of care may be to miss it on the first visit," a statement that while likely accurate does not offer any practical advice in terms of risk management.[20]

In a retrospective analysis of 109 ED patients who were diagnosed with acute AD, Kurabayashi and colleagues found that approximately 60% of patients were misdiagnosed during their initial assessment in the ED.[21] When the patient was misdiagnosed, it was thought that they were having ACS in approximately 63% of cases. Clinically, patients who are misdiagnosed have some unique characteristics. When patients arrived via ambulance, the misdiagnoses rate was 10% compared to 29% in patients who presented via private vehicle. Anterior chest pain is present in 71% of cases that were initially misdiagnosed versus 41% of cases who are correctly identified as having an underlying AD. On radiograph, a widened mediastinum was seen in only 25% of cases where the patient was misdiagnosed versus 55% of cases when a correct diagnosis was made. Overall patients who were misdiagnosed had approximately half the imaging studies as patients who were correctly diagnosed. Interestingly, despite this rate of missed diagnosis, there is no statistical difference in regard to in-hospital mortality (18% vs 15%, $P = .520$).

Palaniappan and colleagues reviewed 135 malpractice cases involving AD. Overall, 23% of cases were settled. When the case went to trial, the jury returned with a defense verdict in 57% of cases while siding with the plaintiff 20% of the time.[22] There were significant differences in terms of the specific allegations of malpractice when a jury sided for the defense versus the plaintiff. In cases where a defense verdict was returned, the most common allegations were failure to test, failure to refer, and failure to consult in the presence of a stroke. When the plaintiff verdict was returned, the most common allegation was failure to diagnose. In terms of payouts, in cases where a patient died, the amount paid on average was less than the amount paid when a patient survived (~US$1,800,000 vs ~US$5,900,000). This may seem counterintuitive but likely is an accurate reflection of the patient population involved in these cases. On average, patients with missed AD are going to be elderly and have an associated lower monetary value given their life expectancy and reduced potential for lost wages. Alternatively, a patient who survives a missed AD likely has ongoing costs associated with their alleged damages and may have a higher overall economic burden.

While specific features of the patient's clinical presentation in isolation do not necessarily help us identify patients who have an underlying AD, a retrospective analysis of

Descargado para Ricardo Rosas (ari08122010@gmail.com) en Ricardo Palma University de ClinicalKey.es por Elsevier en septiembre 02, 2025. Para uso personal exclusivamente. No se permiten otros usos sin autorización. Copyright ©2025. Elsevier Inc. Todos los derechos reservados.

cases of AD by Ohle and colleagues suggests that having a structured approach to patients with a potential AD may help decrease the rates of misdiagnosis.[23] In a review of 194 cases of AD, Ohle and colleagues found that the rate of misdiagnosis was 17.6%. Cases were reviewed to see how many "pain descriptors" were asked and documented. These questions included severity, abrupt onset of pain, radiating pain, general character of pain, and duration of pain. When comparing cases of missed diagnosis versus those of correct diagnosis, severity of pain and duration of pain are asked more often in cases where the correct diagnosis was made. Overall, the study argued that simply gathering additional data by asking more questions can be associated with a lower risk of missed diagnosis. When less than 2 questions were asked, the rate of misdiagnosis was about 20%, which was approximately 4 times higher than was noted in cases where greater than 2 questions were asked. While the study does not give us a clear pathway to reliably reduce the rate of missed diagnosis, it does suggest that simply stopping and thinking about the potential of AD and obtaining a more thorough history may, in fact, reduce the risk of missed diagnosis.

From a risk management standpoint, it is difficult to eliminate the medicolegal risk associated with cases of missed AD. Unlike in the case of ACS and PE where we have validated widely accepted risk stratification tools, short of ordering CT angiography on every patient with chest pain, it is difficult to accurately determine if the patient with nondescript chest pain in the ED has an AD. A recent clinical policy of the American College of Emergency Physicians shed light on the challenging nature of this disease process, finding largely low-quality evidence without identifying a reliable way to rule out the presence of an underlying AD short of getting definitive imaging with angiography.[24] Charting the absence or presence of classic features can buffer against allegations of failure to consider. Unfortunately, cases of missed AD will likely continue to be a rare but significant source of risk to both the patient and the clinician.

RISK MANAGEMENT AT THE BEDSIDE

While no amount of charting can completely prevent a lawsuit given the prevalence of malpractice cases associated with complaints of chest pain, it is reasonable to develop a consistent and concise approach to documenting these encounters. As discussed earlier, the main allegation for ACS, PE, and AD is "failure to consider" the diagnosis. For any cases of undifferentiated chest pain, simply stating "Based on the clinical picture, low risk of ACS, PE, and AD" undoubtedly offers a first line of defense against allegations of malpractice. Beyond this simple broad approach, risk stratification using and documenting an established risk stratification tool such as the HEART score provides an additional layer of protection. A final layer of documentation protection can occur when a clinician identifies potential red flags. For example, if a triage note documents that a patient has tearing/ripping chest pain that radiates to their back it would be reasonable to document why this is *not* concerning for AD and also explicitly stating that you do not think the patient needs definitive testing for evaluation. While there are no clear best practices as to the specifics of documentation, a strong chart would convey the sense that the clinician took the patient seriously, considered the big 3 (ACS, AD, and PE), and made the best decision they could using the available evidence. At the end of the day, failure to make the diagnosis does not necessarily mean that a case has deviated from the standard of care as often when cases are litigated, being able to show a jury that the treating team tried their best to help the patient is generally very supportive to the defense.

Over the past decade, there has been an increased use of shared medical decision-making (SDM) when helping to determine next steps in the treatment and disposition

Descargado para Ricardo Rosas (ari08122010@gmail.com) en Ricardo Palma University de ClinicalKey.es por Elsevier en septiembre 02, 2025. Para uso personal exclusivamente. No se permiten otros usos sin autorización. Copyright ©2025. Elsevier Inc. Todos los derechos reservados.

of patients in the ED with chest pain. On the surface, SDM would seem to lessen the clinician's degree of medicolegal risk as the patient is helping to determine their next steps, yet there is concern that when used incorrectly SDM may actually *increase* a clinician's potential risk. In theory, SDM must offer the patient a choice between reasonable alternative pathways and be made with clinician guidance.

An ideal situation would be a scenario where a patient with a HEART score of 4 chooses to go home with close follow-up rather than be admitted, as both options seem reasonable based on the current medical literature. Alternatively, in a case a patient with a HEART score of 7 was discharged home and ultimately had a bad outcome. When the case was reviewed, the note stated, "SDM was conducted and the patient chose to go home." This case seems to stretch the concept of SDM to a degree that it actually draws the quality of the care into question. Given current literature, discharging a patient home with a HEART score of 7 would not likely be considered to be a reasonable next step. Obviously, there are situations where a patient could choose to go home with a HEART score of 7, but arguably this would involve the patient making a choice to act against what would be standard medical advice. In these situations, patients should be categorized and documented as leaving against medical advice (AMA) rather than leaving after SDM. While this may seem like mere semantics, the distinctions between these 2 designations can be rather significant.

When a patient leaves AMA, the courts have consistently recognized a patient's right to make decisions that would go against standard medical advice. While an AMA discharge does not eliminate the medicolegal risk, it does lower it significantly—in particular, if the clinician can document the discussion and decision making as well as establish that the patient was aware of the risks, had capacity, and still decided to leave. In the case of a patient with a heart score of 7, rather than reducing the clinician's risk, the term SDM could be used to argue that the clinician in fact gave the patient the option of making a high-risk choice.

SUMMARY

It is difficult to work a shift in the ED without seeing a patient with chest pain. Unfortunately, mixed in with the masses of benign chest pain patients, there are time bombs of ACS, PE, and AD that may evolve into malpractice cases. While consistently considering and appropriately risk stratifying for these big 3 ominous causes of chest pain may improve patient outcomes and reduce the medicolegal risk—these steps alone do not eliminate the rare case that slips through. The best approach to minimizing risk is to gather appropriate data and to explain your thought process as to why you do *not* think one of the "big 3" are occurring, but nothing is 100%. A seasoned defense lawyer once remarked, "The most important thing to remember at the end of the day is that you need to keep paying the premiums on your malpractice insurance."

CLINICS CARE POINTS

- It is crucial to consider the risk of ACS, PE, and AD in any patient who presents to the emergency department with chest pain.

DISCLOSURE

The authors have no financial disclosures or conflicts of interest.

Descargado para Ricardo Rosas (ari08122010@gmail.com) en Ricardo Palma University de ClinicalKey.es por Elsevier en septiembre 02, 2025. Para uso personal exclusivamente. No se permiten otros usos sin autorización. Copyright ©2025. Elsevier Inc. Todos los derechos reservados.

REFERENCES

1. American College of Emergency Physicians Clinical Policies Subcommittee (Writing Committee) on Suspected Non–ST-Elevation Acute Coronary Syndromes:, Tomaszewski CA, Nestler D, Shah KH, et al. Clinical Policy: Critical Issues in the Evaluation and Management of Emergency Department Patients With Suspected Non-ST-Elevation Acute Coronary Syndromes. Ann Emerg Med 2018;72(5):e65–106. PMID: 30342745.
2. Wong KE, Parikh PD, Miller KC, et al. Emergency Department and Urgent Care Medical Malpractice Claims 2001-15. West J Emerg Med 2021;22(2):333–8. PMID: 33856320; PMCID: PMC7972370.
3. Pope JH, Selker HP. Acute coronary syndromes in the emergency department: diagnostic characteristics, tests, and challenges. Cardiol Clin 2005;23(4): 423–51, v-vi.
4. Dezman ZD, Mattu A, Body R. Utility of the history and physical examination in the detection of acute coronary syndromes in emergency department patients. West J Emerg Med 2017;18(4):752–60. Epub 2017 May 3. PMID: 28611898; PMCID: PMC5468083.
5. Fesmire FM, Percy RF, Bardoner JB, et al. Usefulness of automated serial 12-lead ECG monitoring during the initial emergency department evaluation of patients with chest pain. Ann Emerg Med 1998;31:3–11.
6. McCabe JM, Armstrong EJ, Ku I, et al. Physician accuracy in interpreting potential ST-segment elevation myocardial infarction electrocardiograms. J Am Heart Assoc 2013;2(5):e000268.
7. Snoey ER, Housset B, Guyon P, et al. Analysis of emergency department interpretation of electrocardiograms. J Accid Emerg Med 1994;11(3):149–53.
8. Todd KH, Hoffman JR, Morgan MT. Effect of cardiologist ECG review on emergency department practice. Ann Emerg Med 1996;27(1):16–21.
9. Wassie M, Lee MS, Sun BC, et al. Single vs serial measurements of cardiac troponin level in the evaluation of patients in the emergency department with suspected acute myocardial infarction. JAMA Netw Open 2021;4(2):e2037930.
10. Rusnak RA, Stair TO, Hansen K, et al. Litigation against the emergency physician: common features in cases of missed myocardial infarction. Ann Emerg Med 1989;18:102934.
11. Wilson E, Phair J, Carnevale M, et al. Common reasons for malpractice lawsuits involving pulmonary embolism and deep vein thrombosis. J Surg Res 2020;245: 212–6. Epub 2019 Aug 14. PMID: 31421365.
12. Stein PD, Beemath A, Matta F, et al. Clinical characteristics of patients with acute pulmonary embolism: data from PIOPED II. Am J Med 2007;120(10):871–9. PMID: 17904458; PMCID: PMC2071924.
13. van Meerten K.F., Haan R.M.A., Dekker I.M.C., et al., The interobserver agreement of the HEART-score, a multicentre prospective study. Eur J Emerg Med. 2021;28(2):111-118. Available at: http://caselaw.findlaw.com/ga-court-of-appeals/1616486.html, Accessed April 27, 2024.
14. ACEP Issues, Available at: https://www.acepnow.com/article/acep-issues-public-censure/. Accessed April 27, 2024.
15. Medson K, Yu J, Liwenborg L, et al. Comparing 'clinical hunch' against clinical decision support systems (PERC rule, wells score, revised Geneva score and YEARS criteria) in the diagnosis of acute pulmonary embolism. BMC Pulm Med 2022;22(1):432. PMID: 36414971; PMCID: PMC9682736.

Descargado para Ricardo Rosas (ari08122010@gmail.com) en Ricardo Palma University de ClinicalKey.es por Elsevier en septiembre 02, 2025. Para uso personal exclusivamente. No se permiten otros usos sin autorización. Copyright ©2025. Elsevier Inc. Todos los derechos reservados.

16. Hoo GW, Wu CC, Vazirani S, et al. Does a clinical decision rule using D-dimer level improve the yield of pulmonary CT angiography? AJR Am J Roentgenol 2011;196(5):1059–64. PMID: 21512071.
17. Clouse WD, Hallett JW Jr, Schaff HV, et al. Acute aortic dissection: population-based incidence compared with degenerative aortic aneurysm rupture. Mayo Clin Proc 2004;79(2):176–80. PMID: 14959911.
18. Alter SM, Eskin B, Allegra JR. Diagnosis of aortic dissection in emergency department patients is rare. West J Emerg Med 2015;16(5):629–31.
19. Nazerian P, Pivetta E, Veglia S, et al. Integrated use of conventional chest radiography cannot rule out acute aortic syndromes in emergency department patients at low clinical probability. Acad Emerg Med 2019;26(11):1255–65. Epub 2019 Jul 22. PMID: 31220387.
20. Elefteriades JA, Barrett PW, Kopf GS. Litigation in nontraumatic aortic diseases–a tempest in the malpractice maelstrom. Cardiology 2008;109(4):263–72.
21. Kurabayashi M, Miwa N, Ueshima D, et al. Factors leading to failure to diagnose acute aortic dissection in the emergency room. J Cardiol 2011;58(3):287–93. Epub 2011 Sep 3. PMID: 21889877.
22. Palaniappan A, Sellke F. Medical malpractice litigations involving aortic dissection. J Thorac Cardiovasc Surg 2022;164(2):600–8. Epub 2020 Oct 29. PMID: 33229180.
23. Ohle R, Mc IS, Perry JJ. A simple intervention to reduce your chance of missing an acute aortic dissection. CJEM 2019;21(5):618–21. PMID: 30907334.
24. American College of Emergency Physicians Clinical Policies Subcommittee (Writing Committee) on Thoracic Aortic Dissection, Diercks DB, Promes SB, Schuur JD, et al. Clinical policy: critical issues in the evaluation and management of adult patients with suspected acute nontraumatic thoracic aortic dissection. Ann Emerg Med 2015;65(1):32–42.e12. Erratum in: Ann Emerg Med. 2017 Nov;70(5):758. PMID: 25529153.

Descargado para Ricardo Rosas (ari08122010@gmail.com) en Ricardo Palma University de ClinicalKey.es por Elsevier en septiembre 02, 2025. Para uso personal exclusivamente. No se permiten otros usos sin autorización. Copyright ©2025. Elsevier Inc. Todos los derechos reservados.